EFFECT OF WORK STATION MODIFICATION WITH SOFT TISSUE MOBILIZATION IN THE IMPROVEMENT OF LUMBAR FLEXION RANGE OF MOTION IN IT PROFESSIONALS SUFFERING WITH CHRONIC LOW BACK PAIN

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Abstract

Low Back Pain is the most common cause of work related disability in persons aged less than 15 years. (Bigos ST 1996). Patients with Chronic low back pain and disability for more than 3 months of duration use more than 80\% of all health care for back pain (Waddell, 1998). Low back pain (LBP) is a common medical problem. There is a 50-70\% chance of a person having LBP pain during his or her lifetime, with a prevalence of about 18\%. In today's computer based business world, workers spend minimum 40 hours per week sitting in front of a computer screen at work. Poor posture develops as a result of long period of sitting. This becomes a habit then they eventually lead to muscle strain and contribute to repetitive strain injury. (Sharma S C et al, 2003).

Bad positioning of the body parts in a single day doesn't make Poor postures, upon repeated wrong positioning, wrong adaptation of muscles, weak muscles which result in abnormal posture. Abnormal posture results in pain, disability and muscle weakness. Reducing pain or correcting the posture is the ultimate aim for a medical profession or physiotherapist, but until the position is corrected this treatment fails or these complain reoccurs.

Purpose of the Study: Purpose of the study is to find out the effect of work station modification with soft tissue mobilization in the improvement of lumbar flexion range of motion in IT professionals suffering with chronic low back pain patients.

Methodology: Study design is a Pre test Vs Post test Experimental study. A total of 40 subjects were selected by Simple random sampling method the age group range form 28-36 yrs. All subjects were divided into two equal groups. Subjects were chosen following an inclusive criteria and exclusive criteria, a clear explanation was given to individual subject on the study procedure. Informed consent was obtained from every subject. Study was conducted for duration of 6 months. Group A, 20 subjects underwent soft tissue

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mobilization technique. Group B, 15 subjects underwent Soft tissue mobilization technique with work station modification. The outcome measure taken in this study was Pain and Range of motion of lumbar spine. VAS used to measure pain whereas Modified-Modified schober's method used to measure Range of motion. Student 't' test was used to find out the difference between the groups.

Result: The result of the study showed that, there was a significant difference between the pre test and post test. The study also found that there was a significant difference between the Group A & Group B.

Conclusion: The study concludes that the work station modification along with soft tissue mobilization was very much effective in improvement of range of motion and pain reduction.

Keywords: Soft tissue mobilization, IT professionals, Back pain, Lumbar range of motion, Schober’s method. Work station modification, VAS.

1. INTRODUCTION

Mechanical Low back pain is one of the commonest complains viewed by general practitioners. Approximately two third of adults are affected by Mechanical Low back pain at some points in their lives. Back pain usually occurs due to sprains and strains in the back as an outcome of static or awkward posture. Sedentary workers often complain of back pain.

Low back pain reportedly occurs at least once in 85% of adults younger than 50 years. It affects Men and Women equally; the onset is more frequently occurs at the age of 30-50 yrs. (Bigos, 1996). Patients with Chronic low back pain and disability for more than 3 months of duration use more than 80% of all health care for back pain (Waddell, 1998). Low back pain has become a major medical and socioeconomic problem among working populations in industrialized countries.

Low back pain (LBP) is a common medical problem. There is a 50-70% chance of a person having LBP pain during his or her lifetime, with a prevalence of about 18%. Low back pain condition can significantly impact on injured worker's quality of life, and productivity, generating substantial costs related to medical service use, sick leave compensation, disability pension and replacement costs. (Morken et al., 2003).

The presence of computer in the workplace leads to a set of peculiar characteristics of the workstation which require the workers to stay in a static posture for long periods (Narmatha 2009). Working people spend minimum 40 hours per week sitting in front of a computer screen at work. Poor posture develops as a result of long period of sitting. This becomes a habit then they eventually lead to muscle strain and contribute to repetitive strain injury.(Sharma et al., 2003).
Bad positioning of the body parts in a single day doesn’t make poor postures, upon repeated wrong positioning, wrong adaptation of muscles, weak muscles which result in abnormal posture. Abnormal posture results in pain, disability and muscle weakness. Reducing pain or correcting the posture is the ultimate aim for a medical profession or physiotherapist, but until the position is corrected this treatment fails or these complain reoccurs.

Many objective measures have been used such as Range of motion, Muscle strength of back, Aerobic capacity, and Range of hip joint motion (Cady 1979). Among these methods, the measure of spinal mobility has been most commonly used for evaluation of Chronic low back pain

Joint Hypomobility is usually defined as a temporary reduction of mobility of a Zygapophyseal joint and it is often focus of treatment for mobilization and manipulation. (Triano 2001)6. A Clinical relationship between Trigger point and joint impairments has been suggested by several authors. (Maitland et al., 2000)7. Lewit 19918 emphasizes the importance of the treatment of trigger point and joint dysfunctions when both were present. Muscle dysfunctions or the facial contraction may result in reduction of mobility in spine. Literatures suggest that intervertebral joint dysfunction may provoke a therapeutic effect in trigger point located in those muscles innervated by the manipulated segment.

Soft tissue mobilization can help the recovery of stiff, painful or overtired muscles by speeding up the elimination of waste products and temporarily increasing the local blood supply. STM works on muscles and it uses Deep friction massage for fascia, Tendons or ligaments. (Cary, 2010).

STM is a combination of technique designed to relax, release and stretch soft tissues. This increases localized circulation, stimulated lymphatic system and increased flexibility and range of motion. It also helps to normalize the muscle tone, relaxes the muscles. (Elizabeth Ojugo) 9

(A) Need for the Study
Posture does not deteriorate in a single day, it is a result of weak musculature and poor develop of bones along with plenty of other causes. During work we must attain proper back, but most of the times it doesn’t.

Postures in order to offload occur back from continuous strain resulting early degeneration. This is important when we stand, sit, and drive for prolonged hours.

Back pain cause strain to the muscles and the fascia, which may result in constriction of muscles. Constriction of the muscles results in reduced range of motion at the spine.

Numerous treatment guidelines have been written regarding the evaluation, treatment, and management of Low back pain.\cite{2, 3}

So it is very necessary to analyze the work station setup and also to modify the work station setup to reduce the occurrence of musculo skeletal discomfort in computer professionals.
(B) Purpose of the Study

Purpose of the study is to find out the effect of work station modification with soft tissue mobilization in the improvement of lumbar flexion range of motion in IT professionals suffering with chronic low back pain patients.

(C) Objectives of the Study

- To find out effect of Soft tissue mobilization on the improvement of lumbar flexion range of motion in subjects with low back pain
- To find out effect of Work station modification on the improvement of lumbar flexion range of motion in subjects with low back pain
- To find out effect of Soft tissue mobilization with Work station modification on the improvement of lumbar flexion range of motion in subjects with low back pain
- To Compare the effect of Soft tissue mobilization with Work station modification on the improvement of lumbar flexion range of motion in subjects with low back pain

2. METHODOLOGY

Study design is a Randomized Controlled Trial. A total of 40 subjects were selected by Simple random sampling method the age group range form 28-36 yrs. All subjects were divided into two equal groups. Subjects were chosen following selection criteria, subjects included in the study are Computer workers with chronic low back pain due to occupational stress diagnosed with help of questionnaire. computer workers with grade of six and above on VAS scale, Computer workers who work on cluster work station were also considered, Computer workers who work on desk tops were only considered and subjects who is not participating in any other research studies and subject not underwent any physiotherapeutic procedures prior to the study at least of 90 days duration. The study excludes subjects with neurological problems like radiating pain, disc injuries, degeneration, T.B spine, spinal abnormalities. Following the selection of subject clear explanation was given to every individual subject. Consent was obtained from every participant, and allowed the participants to withdraw from study at any point of time. Study was conducted for duration of 6 months. An ergonomic session was conducted prior to the selection of the study, and all participants were advised to follow up the ergonomic principles. Group A, 20 subjects underwent Soft tissue mobilization for duration of 20 mins followed with Moist heat was applied. Group B, 20 subjects underwent Soft tissue mobilization for 20 mins. In addition to the treatment session a complete assessment was done at the work site of each worker and modified the work station according to the person’s individual need. An educational programme on Ergonomics, its importance and maintenance of Good posture were educated to the participating subjects. Subject’s queries were cleared during the review sessions.

The outcome was measured using Visual analogue scale for Pain and Modified-Modified schober’s method for Range of motion of lumbar spine. Student ‘t’ test was used to find out the difference between the groups. The study was approved by the ethical committee of K.G. Hospital, Coimbatore.
3. DATA ANALYSIS

Demographic Data

Table I

<table>
<thead>
<tr>
<th>Age group</th>
<th>28-29</th>
<th>30-31</th>
<th>32-34</th>
<th>35-36</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of subjects</td>
<td>10</td>
<td>9</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

Graph I

No of subjects

- 28-29: 10
- 30-31: 9
- 32-34: 11
- 35-36: 10
The demographic representations of the groups are given in Table I. Treatment duration was not analyzed since all underwent same duration. Age group of the participants varies from 28 yrs to 36 yrs and about 27.5 % from 32-34 yrs, 25% from 28-29 yrs, 35-36 yrs and 22.5% from 30-31 yrs.

Table II
Paired ‘t’ Test Range of Motion Group a Pre vs Post

<table>
<thead>
<tr>
<th>S.No</th>
<th>Group A</th>
<th>Mean</th>
<th>Mean Difference</th>
<th>S.D</th>
<th>Paired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre</td>
<td>42</td>
<td>11</td>
<td>0.51</td>
<td>4.82</td>
</tr>
<tr>
<td>2</td>
<td>Post</td>
<td>53</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graph II

The Paired ‘t’ test analyses for the Group A subjects pre test and post test variable for the Range of motion of Lumbar spine using Modified-Modified Schober’s Method which is shown in the Table II. There was a significant difference between the pre test and post test values.

Table III
Paired ‘t’ Test Group B Pre vs Post

<table>
<thead>
<tr>
<th>S.No</th>
<th>Group B</th>
<th>Mean</th>
<th>Mean Difference</th>
<th>S.D</th>
<th>Paired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre</td>
<td>45</td>
<td>46</td>
<td>1.45</td>
<td>7.07</td>
</tr>
<tr>
<td>2</td>
<td>Post</td>
<td>91</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Paired ‘t’ test analyses for Group B, the pre test and post test variable for the Range of motion of Lumbar spine using Modified-Modified Schober’s Method which is shown in the Table III. There is a significant difference between the pre test and post test values.

**Table IV**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Groups</th>
<th>Mean</th>
<th>Mean Difference</th>
<th>S.D</th>
<th>Unpaired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group A</td>
<td>53</td>
<td>38</td>
<td>1.41</td>
<td>4.26</td>
</tr>
<tr>
<td>2</td>
<td>Group B</td>
<td>91</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Graph III**

**Graph IV**
The Unpaired ‘t’ test analyses for the post test of Group A and post test of Group B variable for the Range of motion of Lumbar spine using Modified- Modified Schober’s Method which is shown in the Table IV. There was a significant difference found between the Groups. Group B subjects show superior than Group A.

Table V
Paired ‘t’ Test Pain Scale
Group A

<table>
<thead>
<tr>
<th>S.No</th>
<th>Group A</th>
<th>Mean</th>
<th>Mean Difference</th>
<th>S.D</th>
<th>Paired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre</td>
<td>6.3</td>
<td>1.9</td>
<td>0.813</td>
<td>11.8</td>
</tr>
<tr>
<td>2</td>
<td>Post</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graph V

The Paired ‘t’ test analyses for Group A, the pre test and post test variable for the pain using VAS which is shown in the Table V. There is a significant difference between the pre test and post test values.

Table VI
Paired ‘t’ Test Pain Scale
Group B

<table>
<thead>
<tr>
<th>S.No</th>
<th>Group B</th>
<th>Mean</th>
<th>Mean Difference</th>
<th>S.D</th>
<th>Paired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre</td>
<td>6.45</td>
<td>5.00</td>
<td>1.38</td>
<td>16.2</td>
</tr>
<tr>
<td>2</td>
<td>Post</td>
<td>1.45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Paired ‘t’ test analyses for Group B, the pre test and post test variable for the pain using VAS which is shown in the Table VI. There is a significant difference between the pre test and post test values.

Table VII
Paired ‘t’ Test Pain Scale
Group A vs Group B

<table>
<thead>
<tr>
<th>S.No</th>
<th>Groups</th>
<th>Mean</th>
<th>Mean Difference</th>
<th>S.D</th>
<th>Paired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre</td>
<td>4.4</td>
<td>2.95</td>
<td>1.1</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>Post</td>
<td>1.45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graph VI

Graph VII
The Unpaired 't' test analyses for the post test of Group A and post test of Group B variable for the Pain using VAS which is shown in the Table VII. There was a significant difference found between the Groups. Group B subjects show superior than Group A

4. DISCUSSION

The purpose of the study is to compare the effect of work station modification and soft tissue mobilization in the treatment of chronic low back pain in computer professionals.

Low back pain is one of the most common problems found in desk top job workers. Greater than 4 hours in sitting position with poor posture (44% of computer users) increases chance of back pain (Khan. M.Y, 2005). Researchers show that working for more than 75% of work time in front of computer results in low back pain. Apart from the poor posture, Work pressure and infrequent rest time also predisposes to low back pain. (Jull.K. & Jensen.C, 2005).

Sitting in an office chair can cause low back pain, since sitting add larger amount of pressure to the back muscles, and spinal disks. This pressure is more than in standing. Sitting with slouch position cause more strain on spinal structure and result in pain (John Triano .DC, 2006).

Office chair or A Poorly designed or unsuitable chair, a badly set up desk and sitting at the wrong height can all contribute to lower back pain. Setting up proper or individualized work station can reduce the symptoms.

The most common cause for postural low back pain is muscle tightness. Following an injury or micro trauma, fibroblastic activity forms new connective tissue fibers to reunite the wound as part of the post inflammation fibroblastic phase (Forrest. L, 1983). These fibers are formed through random fibroblastic activity. Local adhesion are formed as scar tissue forms (Cummings.G.S,1983), in addition, there is often a restrictive matrix that has spider-web like tentacles attached to surrounding structures that can alter and limit normal mobility (Cyriax. J, 1984 & Noyesf 1977).


Soft tissue mobilization not only lessens lower back pain, but also the depression, anxiety and improves sleep. Massage therapy also shows improved range of motion. Various researches show that range of motion improves by reduction of tightness in the soft tissue using soft tissue mobilization.

Offices ergonomics or computer ergonomics can help in minimizes risk of low back pain (Nancy. C.S, 2006). Providing proper education, advice and training about work place posture is an integral part of minimizing the low back pain injury in computer professionals (Hugh Babington Smith, 2004). Ergonomic office chair helps in providing maximum back support to maintaining good posture while sitting by adjusting the office chair to the proportions of the individual's body to improve comfort and reduce aggravating factors to the low back and neck while sitting (John J. Triano, DC. 2005).

Sitting heights are adjusted based on anthropometric dimensions of the individual and work surface heights. Providing physical match between the individual and work place should be attained postural awareness.

Body movements at the work station is corrected in order to minimize awkward patterns and reduce stresses resulting from activities such as turning, twisting, over reaching and repetitive bending. (Khalil. M.T, 1993).

Myofascial release, or soft tissue mobilization, is a therapy used to release tension stored in the fascia. Fascias are sheets of fibrous tissue that encase and support muscles separating them into groups and layers. Fascia also covers joints capsules and ligaments. Following trauma, the fascia and muscles may shorten restricting joint movement and blood flow. The techniques used in myofascial release break up fascial adhesions and relaxes muscle tension helping to normalize physical motion within the joint capsule. (Dana L Davis et al., 2010).

Relieving muscle tension with massage also helps neutralize muscle tone which intern result in maintaining of normal range of motion in the spine.

5. CONCLUSION

Thus the study concludes that Soft tissue mobilization has improved the range of motion of lumbar spine. Soft tissue mobilization in addition with work station modification help in improvement of range of motion than soft tissue mobilization.

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REFERENCES


